

Math 212

Quiz 25

F 28 Oct 2016

Your name: _____

Exercise

(5 pt) Let $E \subseteq \mathbf{R}^3$ be the region inside the cylinder $x^2 + y^2 = 1$, above the xy -plane, and below (!) the cone $z = \sqrt{x^2 + y^2}$. We seek to evaluate the triple integral

$$\iiint_E z \, dV.$$

- (a) (1 pt) Sketch the region E . *Hint:* Where does the cone intersect the cylinder?
- (a) (2 pt) State your choice of coordinate system. Write the corresponding differential dV , and give an algebraic description of the region E (i.e. lower and upper limits on the variables) in these coordinates. *Hint:* One variable will have limits that depend on another variable.
- (b) (2 pt) Show that $\iiint_E z \, dV = \frac{\pi}{4}$ (i.e. evaluate the triple integral).